American Standards for Exhaust Systems

CYRIL AINSWORTH

Assistant Secretary, American Standards Association, New York, N. Y.

BECAUSE the Safety Code for Exhaust Systems is now in the process of active development, and in view of the participation of the American Public Health Association in this project through its Industrial Hygiene Section, it was felt desirable by your officers that the plans for carrying on this activity be presented to you for your consideration.

Before going further into this specific question it might be well to present a brief picture of the American Standards Association. Some of you have participated in the development of standards under A.S.A. procedure and are therefore somewhat familiar with its methods of work. With others this is not the case.

The A.S.A. was organized in 1918 by 5 of the major technical societies (mechanical, electrical, civil, and mining engineers and the Society for Testing Materials) for the purpose of properly coördinating the engineering and industrial standardization work which they had been carrying on individually. The organization was then known as the American Engineering Standards Committee. The change to an Association was made in 1928.

The objects of the organization are:

To serve as a clearing house for standardization work in the United States

To further the standardization movement as a means of advancing national economy

To serve as a bureau of information on standardization matters

To act as the authoritative American channel in international coöperation in standardization work.

A large variety of standards is handled including:

1. Nomenclature
   Definitions of technical terms used in specifications and contracts and in other technical work
   Abbreviations
   Symbols for quantities used in equations and formulae
   Graphical symbols
2. Uniformity in dimensions necessary to secure fits; and to provide for the interchangeability of parts and supplies, and the interworking of apparatus
3. Quality specifications for materials and equipment, both for producer goods and for consumer goods
4. Methods of test
5. Ratings of machinery and apparatus which establish test limits under specified conditions as a basis of purchase specifications, or which establish requirements as to performance, durability, safety, etc., under operation
6. Provisions for safety
7. Rules for the operation of apparatus and machinery in industrial establishments
8. Concentration upon the optimum number of types, sizes, and grades of manufactured products

The work is carried out by simple but systematic methods of coöperation, through which all groups interested in any particular project participate: (1) in deciding whether the work shall be undertaken at all; (2) in formulating the standard; and (3) in its ultimate approval as an "American Standard." The arrangement is flexible, and alternative methods have been developed, as the result of experience, all based upon

the same principle, *viz.*, the assent, affirmatively expressed, of the groups having a substantial concern with the scope and provisions of the standard.

The usual method is that of a joint technical committee, made up of representatives of the various interested groups. These joint committees form effective cross-sections of the interested groups, and are called sectional committees. This is the method being followed in the development of the safety code for exhaust systems. In large projects such as this the detailed work is generally drafted by sub-committees.

To date, 266 standards have been approved and 173 others are under way. In this, more than 600 national organizations are officially participating. Approximately 3,000 experts are serving on the various committees.

A very important group of the standards approved by the A.S.A. is that group comprising the 40-odd safety codes. This phase of A.S.A. work was initiated in 1919 following two conferences held in Washington, D. C., under the auspices of the U. S. Department of Labor and the National Bureau of Standards, called to discuss ways and means of obtaining relief from the situation caused by the multitudinous number of conflicting rules, regulations, and safe practice recommendations, which had been developed and promulgated by regulatory bodies, insurance groups, trade associations, and individual companies. As a result of the discussions the A.S.A. was requested to extend its scope of activities to include the development of safety codes on a national basis.

The American Standards Association accepted this mandate and changed its form of organization to include a safety group composed of the National Safety Council, both stock and mutual casualty insurance companies, the U. S. Department of Labor and the National Bureau of Standards. A National advisory committee now known as the Safety Code Correlating Committee was organized to advise the A.S.A. in regard to the nature of the projects that should be undertaken, the appointment of technical committees, the scope of the work of individual projects, and to determine the degree of consensus that has been arrived at on the acceptability of codes submitted for approval as "American Standards." In addition to the organizations just mentioned, several industrial groups—fire protection organizations, the International Association of Industrial Accident Boards and Commissions, and the Association of Governmental Labor Officials—are represented on this national advisory committee.

The program developed by this committee has grown in the number of codes completed and under way, and in the extent of the use of A.S.A. Safety Codes by regulatory bodies, insurance groups, individual trade organizations and companies. Many departments of labor and industrial accident commissions have either adopted many of the codes verbatim or used them as the basis of state regulations. The National Compensation Rating Schedule of the insurance companies has been brought into harmony with A.S.A. codes. In states where the schedule is no longer effective, American Standard Safety Codes are used as the basis of insurance recommendations for the removal of accident hazards in industrial establishments.

A number of important safety codes are under development at the present time. Some of these were initiated as part of the original program outlined by the Safety Code Correlating Committee.

The code for exhaust systems is such a project, and although a number of years have elapsed without much progress being made, it is gratifying to report that the committee is now quite active.

When the code for exhaust systems was initiated some years ago it was intended that its scope would cover the construction and operation of such systems from an engineering point of view. The delay in developing a code around this scope came chiefly through the conflicts of opinion existing in the group comprising manufacturers of exhaust equipment. Some believed that trade secrets were involved. Others differed as to the engineering principles involved. All of these differences resulted in years of delay. Finally the organization which was then sponsor for the project, the American Society of Heating and Ventilating Engineers, asked to be relieved of its duties as administrative leader for the work in order to be able to devote all its attention to the ventilation code. The request was granted and the International Association of Industrial Accident Boards and Commissions took over the administrative responsibilities for the work.

The new sponsor immediately proceeded to reorganize the sectional committee. New organizations were added, and representation of other organizations were changed. Since this reorganization has taken place two meetings of the committee have been held and a new scope and a plan of operation have been adopted.

The sectional committee has decided to approach the very difficult task with which it is faced by developing, step by step, a set of separate standard specifications for exhaust hood designs and air velocities for each distinct process or industry. Thus each group of specifications will constitute a separate standard applicable only to the specified process or industry. Initial projects upon which sub-committees are about to be appointed are as follows:

1. Abrasive Cleaning
2. Chronium Plating
3. Granite Cutting
4. Rock Drilling
5. Spray Coating

While it is contemplated that additional exhaust specifications will be developed for additional processes as opportunity offers, the above group was chosen because there appear to be already available sufficient data from field studies and laboratory research upon which reasonable and adequate standards can be based.

During the past several years there has developed in many industries throughout the country a very exceptional and severe claim situation based on the alleged exposure of industrial workers to a considerable variety of materials that contaminate the workroom air—the claims being based on so-called " occupational diseases " resulting from the inhalation of air containing allegedly injurious substances in dangerous concentrations. While the accurate evaluation of these occupational disease claims is a medical one beyond the scope of A.S.A. undertakings, the problem of minimizing the exposures in question is largely an engineering problem of exhaust equipment applied to the process that causes contamination of the workroom air, a problem quite amenable to standardization. No uniformity of practice throughout industry has developed as yet to meet the situation.

Of considerable importance in this connection is the wide variation in existing State Labor Department Regulations that have been promulgated to correct the hazards here in question. In many instances, these regulations are too general in phraseology to prove of assistance to industry in applying specific corrective measures. In other instances the standards of performance are set impracticably and unnecessarily high. In general, it is fair to say that these local regulations have not been worked out with sufficient technical skill to prove of practical value to plant managements in their efforts to solve their occupational disease problems. This is quite understandable as very few

if any of the regulatory bodies have had sufficient funds, particularly during the past few years, to enable them to carry on the research and field work that is so essential in securing adequate information. One might also raise the question as to whether or not the best results can be obtained if a considerable number of independent research projects on the same subject are undertaken. It would seem much better if such activities could be correlated through one central clearing house and in connection with a well thought out and well coördinated plan of standards development.

In addition, and quite unfortunately, the mere technicalities of state regulations are at times being utilized in law suits to establish the legal status of negligence more or less regardless of any medical proof that injury has actually been received by the claimant in the course of his employment.

It is the hope of the Exhaust Code Sectional Committee that national standards for exhaust of numerous industrial processes can be developed with such weight of technical authority back of them that these "American Standards" will either be used verbatim by state regulatory bodies, or that the technical principles established in the standards will be used as the basis of state regulations. The committee hopes to appoint an advisory committee of toxicological, pathological, and engineering experts to assist in the determination of threshold limits for the toxic dusts, gases, and fumes, that are to be removed through the use of exhaust systems. This, it is hoped, will tend to coördinate the existing points of view of experts, and also give the standards the authoritativeness which will automatically obtain the acceptance which the committee anticipates.

Already the financial losses incurred by industries throughout the country from occupational disease claims have mounted into millions of dollars, and there appears to be an increasing demand from all persons interested that adequate but practically reasonable standards be developed for these hazards, especially along the lines of exhaust equipment which is the logical solution of the great majority of industrial hazards of this type. The Exhaust Code Committee has an extensive problem before it that involves a considerable volume of detail and it welcomes the full coöperation and participation of the American Public Health Association in this work.